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FOREST INSECT CONDITIONS

IN THE NORTHERN REGION

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COVER PHOTOGRAPH:

Small spruce beetle larvae in common feeding gallery.

FOREST INSECT CONDITIONS IN THE NORTHERN REGION 1968

By

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CONDITIONS IN BRIEF

The spruce budworm epidemic increased in severity and expanded in Douglas-fir and true fir forests of Idaho and western Montana. Over 4 million acres of defoliation are visible from the air. A severe outbreak of spruce beetle developed in slash and windthrown Engelmann spruce trees in the Flathead National Forest, Montana. Logging-for-control is planned. Damage by the mountain pine beetle continued to increase in mature lodgepole, ponderosa, and white pine stands of the Region. Approximately 1,300 infested ponderosa pine trees on Monarch Mountain were treated with toxic chemicals. Ponderosa pine tree killing by Ips bark beetles decreased throughout western Montana. Larch casebearer continued to spread and was reported for the first time in Glacier National Park, Montana. Some 40,000 square miles of larch are now infested in the Northern Region. Infestations of sugar pine tortrix decreased, but defoliation caused by the pine needle-sheath miner increased. Spruce budworm and the fir cone worm destroyed a high percentage of Douglas-fir seed in some areas of Montana.

No major projects were undertaken to control defoliating insects during the year. No large-scale chemical control projects are planned for 1969.

Major insect problem areas are shown in figure 1.

STATUS OF INSECTS

LARCH CASEBEARER, Coleophora laricella (Hbn.). The larch casebearer is fast becoming the number one insect pest in the Northern Region. Epidemic populations continue to spread through larch stands of eastern Washington, northern Idaho, and western Montana (fig. 2). About 40,000 square miles of timbered stands mixed with western larch are infested. Defoliation was recorded for the first time near Lake McDonald, Glacier National Park.

The infestation extends from about 15 miles west of Okanogan, Washington, east into Glacier National Park, Montana, and from British Columbia, south to Riggins, Idaho, and Hamilton, Montana.

Although spread has been predominantly north and east, there is a slow, steady movement west and south.

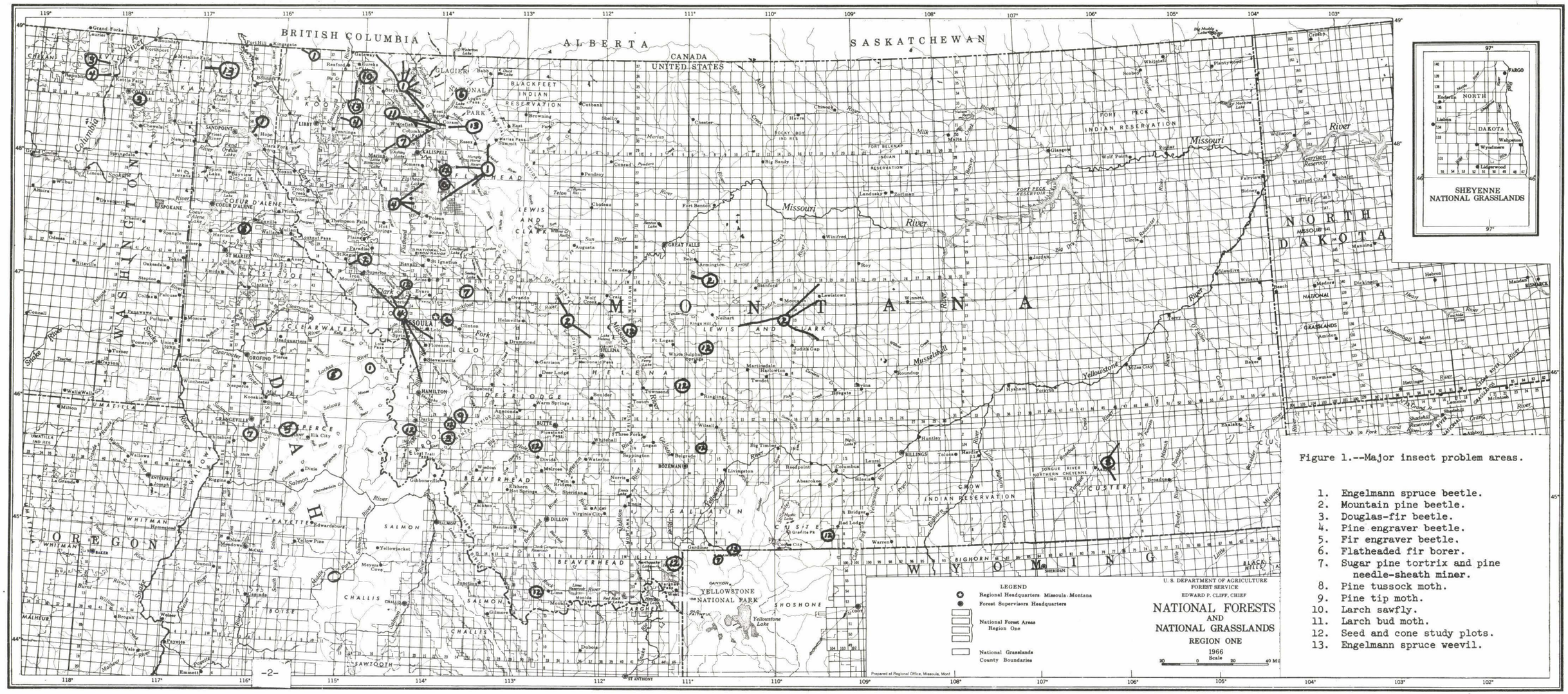
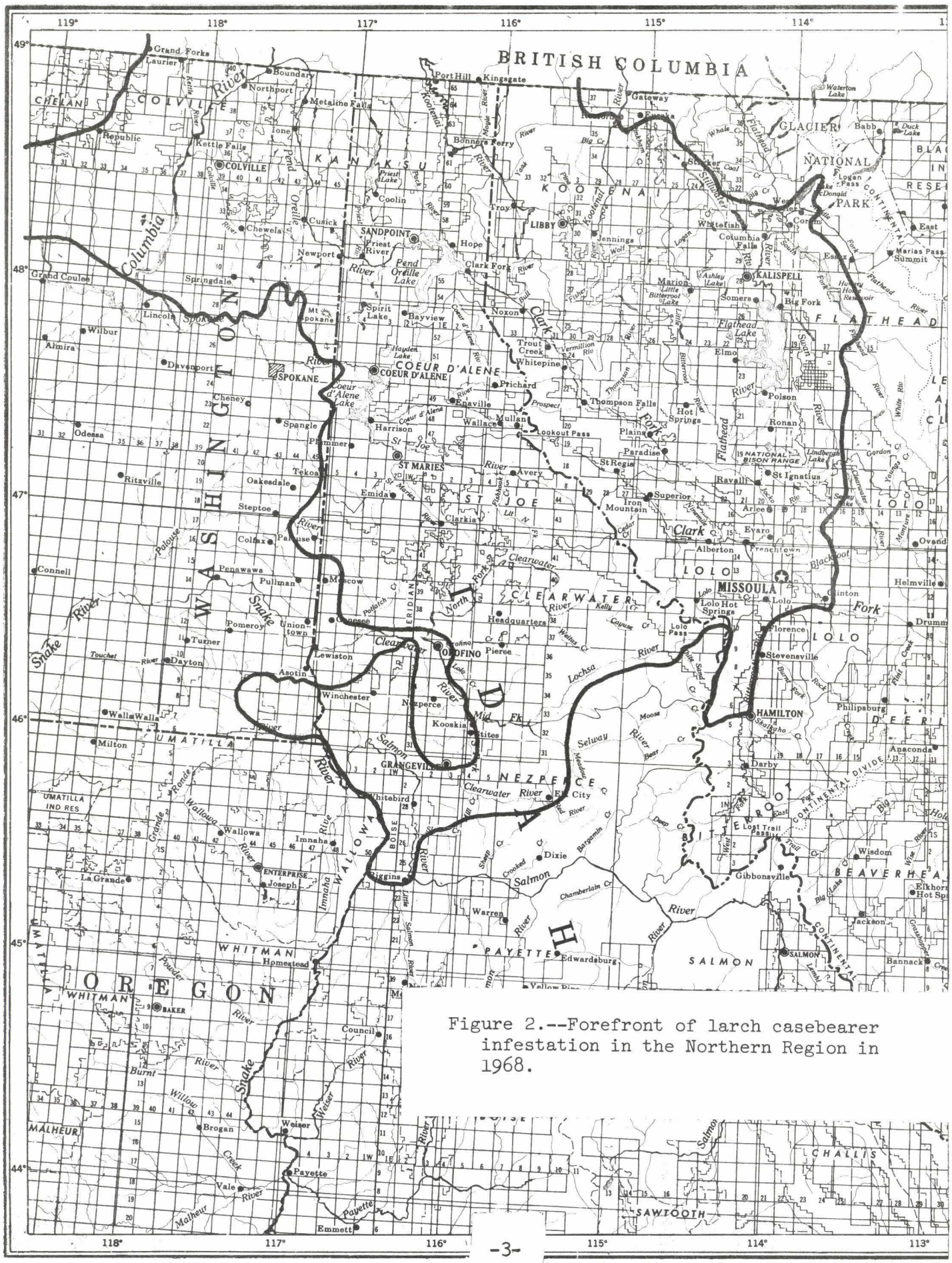


Figure 1.--Major insect problem areas.

1. Engelmann spruce beetle.
2. Mountain pine beetle.
3. Douglas-fir beetle.
4. Pine engraver beetle.
5. Fir engraver beetle.
6. Flatheaded fir borer.
7. Sugar pine tortrix and pine needle-sheath miner.
8. Pine tussock moth.
9. Pine tip moth.
10. Larch sawfly.
11. Larch bud moth.
12. Seed and cone study plots.
13. Engelmann spruce weevil.


BRITISH COLUMBIA
WASHINGTON
OREGON
IDAHO
MONTANA
COLVILLE
KANIKSU
KOOTENAI
COEUR D'ALENE
SPOKANE
ST MARIES
ST JOE
CLEARWATER
NEZPERCE
LOLO
FLATHEAD
MISSOULA
KALISPELL
LIBBY
SANDPOINT
COLVILLE
GRANGEVILLE
OROFINO
LEWISTON
MOSCOW
PULLMAN
WALLA WALLA
BAKER
ENTERPRISE
JOSEPH
WALLOWA
HAMILTON
SALMON
CHALLIS
SAWTOOTH
Columbia River
Snake River
Clearwater River
Salmon River
Kootenai River
Clark Fork River
Pend Oreille Lake
Coeur d'Alene Lake
Flathead Lake
Bitterroot River
Flathead River
Missoula
Lewiston
Spokane
Kalispell
Libby
Sandpoint
Grangeville
Orofino
Moscow
Pullman
Walla Walla
Baker
Enterprise
Joseph
Hamilton
Salmon
Challis
Sawtooth
Glacier National Park
Lolo Pass
Lost Trail Pass
Continental Divide
Umatilla Ind Res
Nezperce
Whitman
Malheur
Payette
Boise
Wallowa
Grande Ronde
Selway
Lochsa
Bitterroot
Thompson
Swan
Blackfoot
Big Hole
Beaverhead
Deerlodge
Powell
Lolo
Missoula
Ravalli
Mineral
Sanders
Lincoln
Pend Oreille
Stevens
Ferry
Okanogan
Chelan
Douglas
Grant
Adams
Whitman
Asotin
Garfield
Columbia
Walla Walla
Umatilla
Morrow
Gilliam
Wheeler
Sherman
Wasco
Jefferson
Crook
Deschutes
Klamath
Lake
Harney
Malheur
Baker
Union
Wallowa
Grant
Wheeler
Gilliam
Morrow
Umatilla
Wasco
Sherman
Jefferson
Deschutes
Crook

The only remaining uninfested stands occur in central Washington and Oregon (fig. 3). If the casebearer continued its insidious spread, these stands may become infested within a few years.

Branch dieback and tree mortality occurred in Hudlow Creek northeast of Coeur d'Alene, Idaho, and in many scattered areas of the St. Joe and Kaniksu National Forests, Idaho. The trend of damage throughout the infestation is upward.

Evidence of casebearer feeding on other coniferous tree species was observed in an area of very severe larch defoliation near the Falls Ranger Station, Kaniksu National Forest, north of Priest River, Idaho. Needle mining was most evident on understory grand fir (fig. 4), mountain hemlock, Douglas-fir (fig. 5), and Engelmann spruce. Starvation probably caused the casebearer to drop in search of food. Needles of Douglas-fir and hemlock were completely mined, causing them to drop. It is unlikely casebearer will complete their development by feeding on these conifers, and this occurrence is not expected to continue.

Figure 3.--Botanical range of western larch.

Figure 4.--Larch casebearer-mined grand fir needles.

Figure 5.--Larch casebearer larvae feeding in Douglas-fir needles.

A CASEBEARER PARASITE, Agathis pumila (Ratz.). More than 500,000 parasites were released in western Montana during 1968. No releases were made in Idaho.

Evaluations show adult parasite releases made in 1960 through 1964 have resulted in 75 percent colony establishment. Only 42 percent of releases by the branch or twig method have been successful, but this may be due to sampling procedures and the limited time for establishment since the parasite releases were made. Parasite spread is very slow; however, two were recovered 1 mile from plot center at one 1960 adult release site. Most have been recovered within one-quarter to one-half mile from release point. Parasites have not spread from point of release in those areas where the branch method was used.

Parasite distribution will continue in 1969.

SPRUCE BUDWORM, Choristoneura fumiferana complex. A widespread increase in scope and severity of spruce budworm infestations occurred in northern Idaho and western Montana in 1968 (fig. 6). Defoliation occurred in some areas of north Idaho for the first time in 15 years.

The largest increase and most severe damage in 1968 was found on the Nezperce National Forest, Idaho.

Defoliation continued to decrease east of the Continental Divide in Montana. However, severe defoliation occurred near Mammoth in Yellowstone National Park, throughout Rock Creek area south of Livingston, Montana (sprayed with Malathion in 1966), and in scattered areas along the Boulder and Stillwater River drainages south of Big Timber, Montana.

Tree mortality from budworm feeding continues on the drier sites in eastern Montana. Heavy tree mortality has developed in some drainages along low outer edges of south-facing slopes of the Big Snowy Mountains, Lewis and Clark National Forest, east of Judith Gap, Montana.

Data collected during past 10 years show no correlation between number of egg masses and resultant defoliation (table 1).

Table 1.--Annual measurements of visible acreage infested, percent defoliation, and spruce budworm egg masses per 1,000 square inches of foliage from 25 permanent plots since 1959 in Montana

Year	Acres infested	Percent defoliation	Egg masses
1959	3,569,832	38.0	10.4
1960	4,484,832	34.0	4.1
1961	2,821,047	37.0	8.4
1962	2,895,959	25.0	10.5
1963	2,011,704	35.0	9.5
1964	2,189,590	35.0	11.9
1965	2,207,186	38.0	5.3
1966	707,180	35.0	10.2
1967	1,946,300	14.0	8.3
1968	4,579,982	19.0	6.2

Plots are widely scattered throughout total infested area. Samples consist of two 1,000-square-inch foliage collections taken at midcrown on Douglas-fir from each area.

A breakdown of visible defoliation by National Forest, Bureau of Land Management, and Yellowstone National Park is shown in table 2.

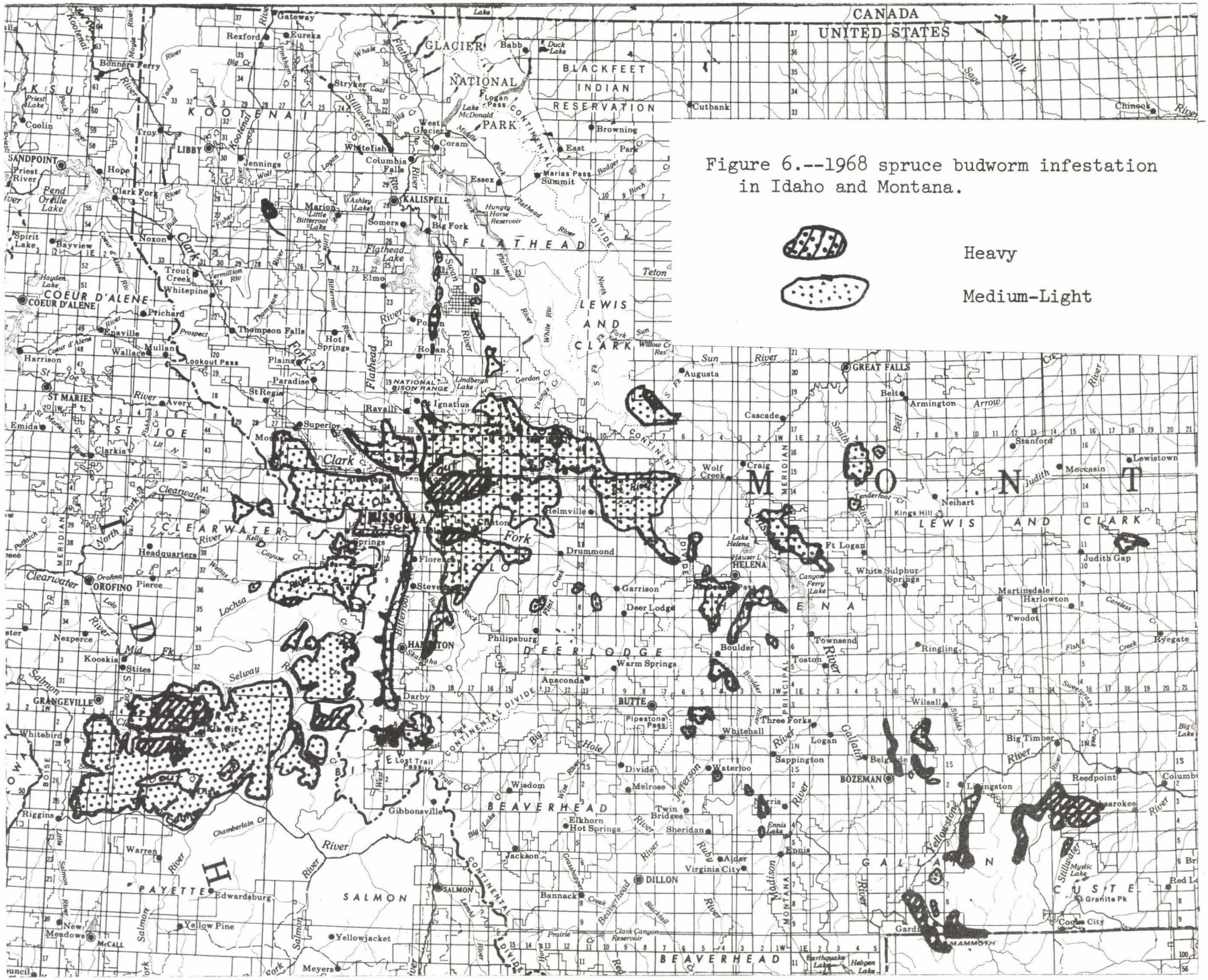


Figure 6.--1968 spruce budworm infestation in Idaho and Montana.

Table 2.--Acreage of defoliation visible from the air in Region 1 during 1968

Forest, BLM, and NP	Light-moderate	Heavy	Total
Beaverhead NF	11,500	--	11,500
Bitterroot NF	295,200	99,700	394,900
Clearwater NF	182,000	58,600	240,600
Coeur d'Alene NF	13,133	--	13,133
Custer NF	31,100	19,300	50,400
Deerlodge NF	58,800	--	58,800
Flathead NF[1/]	83,900	3,100	87,000
Gallatin NF	98,700	88,600	187,300
Helena NF	465,000	960	465,960
Lewis and Clark NF	131,600	25,500	157,100
Lolo NF	1,247,300	159,280	1,406,580
Nezperce NF	1,072,700	237,400	1,310,100
BLM--Judith River	7,910	--	7,910
Garnet Range	150,316	14,143	164,459
Yellowstone NP	5,100	17,600	22,700
			4,578,442

1/ Includes BIA lands.

Two heavily defoliated areas of mixed fir, spruce, larch, lodgepole, and ponderosa pine were sprayed with 1 ounce (6 percent by volume) of Zectran in 1 pint of Dowanol (carrier) per acre in the Blackfoot River drainage, Montana. Population reduction was 70.0 ± 4.2 percent in Belmont Creek and 47.8 ± 55 percent in Chamberlain Creek. Poor results are attributed to adverse climatic and atmospheric conditions during spraying.

An aerial application of Zectran on about 18,000 acres is planned for 1969. Proposed test area includes four 4,500-acre spray plots on the Nezperce National Forest near Grangeville, Idaho. Two C-47 aircraft--one Forest Service and one contract--will apply the insecticide at the rate of 0.15 pound in one-half gallon of Dowanol carrier per acre.

The increasing trend in north Idaho and western Montana is expected to continue through 1969.

The budworm caused extensive damage by feeding on new shoot growth of young larch (fig. 7). Budworm also feed on foliage, but damage as seen in figure 8 is most significant to new shoot growth, causing multiple leaders. Most severe damage was observed in Chamberlain Creek on BLM lands near Ovando, Montana. Intermountain Station entomologist reported extensive damage near Seeley Lake, Montana. Station personnel are conducting intensive studies about budworm damage to young larch.

Figure 7.--Spruce budworm feeding on larch shoots results in multiple tops. An undamaged top is shown at the right in photograph.

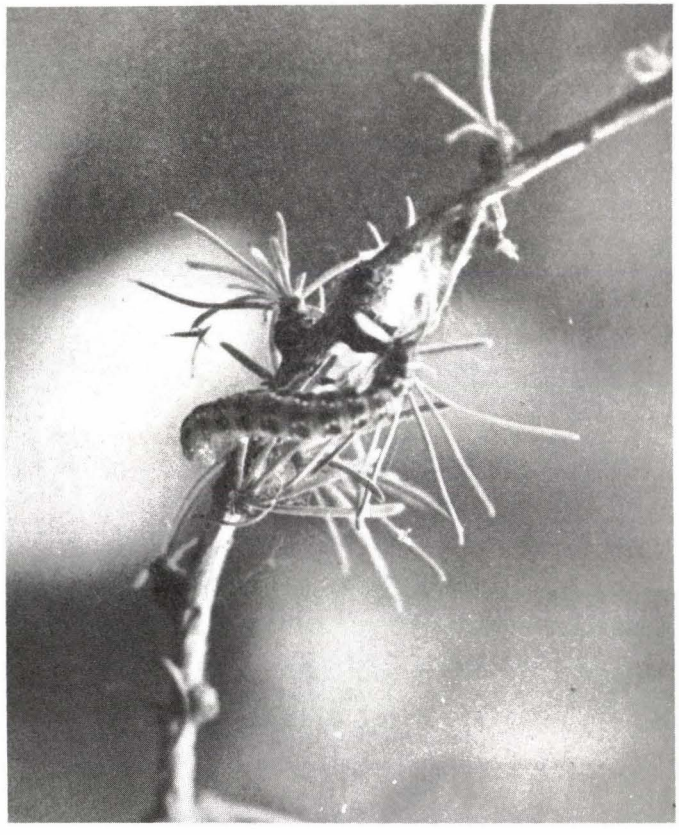


Figure 8.--Spruce budworm feeding on larch needles.

ENGELMANN SPRUCE BEETLE, Dendroctonus obesus (Mann.) = (D. engelmanni Hopk.). A major outbreak of spruce beetles developed in northwestern Montana in 1968. It is believed the infestation started in trees uprooted by strong winds in 1964. Logging slash left unburned may have also contributed in beetle population buildup. Most serious outbreaks occurred on parts of the Kootenai and Flathead National Forests, and adjacent State and private lands, Montana. Surveys show from 7 to 35 trees are infested per acre in almost all drainages along North Fork Flathead River, Glacier View Ranger District, Flathead National Forest. Outbreaks of lesser magnitude occurred on parts of the Kootenai National Forest, Montana, and the Clearwater and Kaniksu National Forests, Idaho.

Suppression by use of trap trees may be needed to reduce additional standing trees from being attacked in the Therriault Lake recreation area, Kootenai National Forest, Montana.

Logging-for-control of about 170 MMBF of infested spruce is planned for the Flathead National Forest before the next major beetle flight in 1970.

Approximately 300 infested windthrown spruce in the proposed Jewel Basin Scenic Area, Flathead National Forest, will be sprayed with ethylene dibromide during July 1969.

MOUNTAIN PINE BEETLE, Dendroctonus ponderosae Hopk. = (D. monticolae Hopk.). The mountain pine beetle has caused serious losses in over-mature western white pine, ponderosa pine, and lodgepole pine stands of the Northern Rocky Mountain Region since 1963. Chronic white pine tree killing occurred in the headwaters of Upper Priest River, Priest Lake District, Kaniksu National Forest, Idaho. Infestations are still active in lodgepole pine near St. Regis, Montana, and in ponderosa pine along the foothills of the Big and Little Snowy Mountains, Montana. Infestations remained static in lodgepole pine on the Yaak District, Kootenai National Forest, Montana. Beetle populations are endemic in ponderosa pine on the Lincoln District, Helena National Forest, Montana, and on BLM and private lands near Lewistown, Montana.

Approximately 1,300 infested trees on Monarch Mountain, Belt Creek District, Lewis and Clark National Forest, Montana, were sprayed with ethylene dibromide in June and about 300 trees will need to be treated in 1969 to suppress this outbreak.

PINE ENGRAVER, Ips pini (Say.). Tree killing by Ips beetles decreased in Montana and Idaho in 1968. The decrease in beetle activity may be attributed to a moist spring. Several small groups of 2 to 25 trees were recently killed in the Flathead Valley near Polson, Montana, and two groups of about 1,000 trees each along the Clark Fork River near Frenchtown, Montana. Mountain pine beetle and western pine beetle, Dendroctonus brevicomis, continue to fill in the bases of Ips top killed ponderosa pine. No buildup of economic importance of these beetle populations has occurred. Losses from pine engraver are expected to continue to decrease in 1969.

LODGEPOLE PINE TERMINAL FEEDERS. A complex of lodgepole pine terminal feeders which include the sugar pine tortrix, Choristoneura lambertiana (Busck.); the pine needle-sheath miner, Zelleria haimbachi Busck.; and unidentified sawfly and geometrid sp. caused light to moderate defoliation in about 170,000 acres of lodgepole pine stands in Montana, Idaho, and Yellowstone Park, Wyoming. The needle-sheath miner alone caused more than 50 percent of the defoliation. A slight decrease occurred in sugar pine tortrix populations. Damage trend is expected to be static through 1969.

SEED AND CONE INSECTS. Analysis of data from permanent plots in Montana indicate Douglas-fir seed destroyed by spruce budworm, Choristoneura fumiferana complex decreased; however, fewer cones were produced this year. The fir cone worm, Dioryctria abietella (D. & S.), caused as much damage as budworm. Douglas-fir scale midge, Contarinia washingtonensis Johnson and the Douglas-fir seed chalcid, Megastigmus spermotrophus Wachtl., accounted for moderate seed losses.

DOUGLAS-FIR BEETLE, Dendroctonus pseudotsugae. Tree killing by this bark beetle was observed in the East Fork Bitterroot River drainage, Montana, and along the north-facing slopes of the Salmon River near Riggins, Idaho. Salvage logging-for-control is being done in accessible areas.

FIR ENGRAVER, Scolytus ventralis LeC. Tree killing by this bark beetle has increased the past few years in grand fir on the Coeur d'Alene and Clearwater National Forests, Idaho. Logging-for-control is planned for most large infested areas.

A PINE TUSSOCK MOTH, Dasychira sp. near or equal grisefacta Dyar. Hibernating larvae of this tussock moth were found under the bark of ponderosa pine in very scattered areas from Liscom Butte south to Poker Jim Lookout on the Custer National Forest, Montana. Light defoliation of pine reproduction was evident near Liscom Butte. Defoliation was not visible from the air. Populations are expected to remain at a low level through next year.

PINE SHOOT MOTH, Eucosma sp. Populations of this insect caused heavy tip killing in a ponderosa pine plantation near Joe Springs on the Nezperce National Forest, Idaho. Tip killing will probably continue in 1969.

FLATHEADED FIR BORER, Melanophila drummondi. Flatheaded borers (fig. 9) continued to kill Douglas-fir along the east shore of Flathead Lake, Montana. Most mortality is in stands with very heavy mistletoe infection. Scattered trees along dry, open hillsides have also been attacked and killed. Woodpecker predation is heavy in all infested areas. Some tree mortality is expected to continue through 1969, particularly in the mistletoe areas.

Figure 9.--Flatheaded fir borer,
M. drummondi on Douglas-fir.

OTHER INSECTS. The larch bud moth, Zeiraphera griseana (Hbn.) and larch sawfly, Pristiphora erichsonii (Htg.) were generally endemic in north Idaho and Montana with only light, scattered feeding in most areas. Populations of western pine beetle, Dendroctonus brevicomis LeC. remain at low levels in ponderosa pine top killed by engraver beetles along the Clark Fork drainage. Top killing of spruce reproduction in north Idaho and Montana by the Engelmann spruce weevil, Pissodes engelmanni Hopk., remained the same as last year. A flea beetle on alder, Altica sp., caused skeletonization of from 75 to 100 percent of the foliage of alder--north from Sandpoint, Idaho, into British Columbia.

An unidentified larva, probably Petrova sp., caused top kill of young lodgepole pine along the south shore of Lake McDonald in Glacier National Park (fig. 10).

Figure 10.--Feeding by unidentified larvae, probably Petrova sp., results in top kill of young lodgepole pine.